

Consideration of Water Supply Issues in the Development of the Nutrient TMDL

Pennsylvania's water quality standards implementation regulations include a statement on water quality protection requirements. See Pennsylvania Code, Title 25, Environmental Protection, Chapter 96. Subsection 96.3(d) states that "As an exception to subsection (c), the water quality criteria for total dissolved solids, nitrite-nitrate, phenolics and flouride established for the protection of potable water supply shall be met at least 99% of the time at the point of all existing or planned surface potable water supply withdrawals unless otherwise specified in this title." Chapter 93 of Title 25 sets the water quality criteria for nitrite-nitrate concentration for a potable water supply at 10 mg/L. These requirements formed the basis for the development of the nutrient TMDLs for the Wissahickon Creek watershed.

There are no known surface potable water supplies nor planned surface potable water supplies in the the Wissahickon Creek watershed. However, during low flow periods, a significant portion (up to approximately 27%) of the water intake at the City of Philadelphia's (the City) Queen Lane water supply intake on the Schuylkill River is water from the Wissahickon Creek. The City's intake is on the Schuylkill River approximately 0.5 miles below the confluence with the Wissahickon Creek and on the bank of the same side of the Schuylkill River as the Wissahickon Creek. The above cited Pennsylvania regulation requires that potable water supplies be protected from high levels of nitrite-nitrates. There is no indication in these regulations that the intake must be on the specific stream in order to limit the nitrite-nitrates for the specific stream. Rather the protection goes to the intake location.

Based on the above noted requirements in the Pennsylvania regulations, EPA considered the need to protection the City's Queen Lane water supply intake from high levels of nitrite-nitrates. In considering this protection, EPA developed nitrite-nitrate concentrations necessary at the mouth of the Wissahickon Creek in order to assure that the 10 mg/l NO₂-NO₃ requirement of the Pennsylvania water quality standards is met at the City's intake after mixing with the Schuylkill River water at the intake.

Because the City's water intake consists of a mixture of Schuylkill and Wissahickon water, a mass balance approach was used to determine the NO₂-NO₃ concentration required at the mouth of the Wissahickon. Water quality data was evaluated for the Schuylkill River and several NO₂-NO₃ concentrations were determined; the mean August concentration, the maximum August concentration, and the mean concentration at the lowest 10 percentile of streamflows (low flow). A mass balance approach was then used to determine the concentration of NO₂-NO₃ at the mouth of the Wissahickon Creek necessary to meet the 10 mg/L NO₂-NO₃ requirement from the state's standards. This was done for two scenarios; one with 27% of the Wissahickon Creek water mixing with the Schuylkill River at the intake and the other with 16% of the Wissahickon Creek water. Table J-1 below shows the concentration necessary at the mouth of the Creek for each case. EPA has considered a margin of safety in this analysis and has set the concentration

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necessary to meet the state potable water supply requirement of 10 mg/l to 19 mg/L at the end of creek. The allocations presented in Section 4 of the TMDL report reflect these results.

Table E-1 NO₂-NO₃ Concentrations at the Mouth of the Wissahickon Creek to meet the State Potable Water Supply Criteria at 27% Wissahickon Flow Contribution

	Schuylkill River NO ₂ -NO ₃ concentrations (mg/L)	NO ₂ -NO ₃ Concentration at City Intake (mg/L)	NO ₂ -NO ₃ concentration at mouth of Wissahickon (mg/L)
Assuming 27% of the Intake is Wissahickon Creek Water			
August mean Conc	3.1	8.74	24
August max Conc	3.8	9.25	24
Lowest 10% flow conc - mean	3.6	9.11	24
Lowest 10% flow conc - maximum	4.8	9.98	24
Assuming 16% of the Intake is Wissahickon Creek Water			
August mean Conc	3.1	8.2	35
August max Conc	3.8	8.79	35
Lowest 10% flow conc - mean	3.6	8.62	35
Lowest 10% flow conc - maximum	4.8	9.63	35